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## Micron and Intel Extend their Leadership in 3D NAND Flash memory

### Announce Qualification of Industry's First 4 bits/cell 3D NAND and the Development of 96-Layer 3D NAND Structure

#### News Highlights

- | Intel-Micron delivers the 1<sup>st</sup> commercially available 1Tb - 4bits/cell (QLC) die in the history of semiconductors
- | Qualification of 4bits/cell 3D NAND on 64 layer 2<sup>nd</sup> Gen 3D NAND has been completed. 4bits/cell (QLC) provides 33% higher density compared to 3bits/cell (TLC)
- | 3<sup>rd</sup> Generation 3D NAND uses 96 layers to maintain cost/density leadership
- | 3<sup>rd</sup> Generation 3D NAND enables the industry's highest Gb/mm<sup>2</sup> areal density

BOISE, Idaho and SANTA CLARA, Calif., May 21, 2018 (GLOBE NEWSWIRE) -- Micron Technology, Inc. (Nasdaq:MU), and Intel Corporation today announced production and shipment of the industry's first 4bits/cell 3D NAND technology. Leveraging a proven 64-layer structure, the new 4bits/cell NAND technology achieves 1 terabit (Tb) density per die, the world's highest-density flash memory.

The companies also announced development progress on the third-generation 96-tier 3D NAND structure, providing a 50 percent increase in layers. These advancements in the cell structure continue the companies' leadership in producing the world's highest Gb/mm<sup>2</sup> areal density.

Both NAND technology advancements—the 64-layer QLC and 96-layer TLC technologies —utilize CMOS under the array (CuA) technology to reduce die sizes and deliver improved performance when compared to competitive approaches. By leveraging four planes vs the competitors' two planes, the new Intel and Micron NAND flash memory can write and read more cells in parallel, which delivers faster throughput and higher bandwidth at the system level.

The new 64-layer 4bits/cell NAND technology enables denser storage in a smaller space, bringing significant cost savings for read-intensive cloud workloads. It is also well-suited for consumer and client computing applications, providing cost-optimized storage solutions.

"With introduction of 64-layer 4bits/cell NAND technology, we are achieving 33 percent higher array density compared to TLC, which enables us to produce the first commercially available 1 terabit die in the history of semiconductors," said Micron Executive Vice President, Technology Development, Scott DeBoer. "We're continuing flash technology innovation with our 96-layer structure, condensing even more data into smaller spaces, unlocking the possibilities of workload capability and application construction."

"Commercialization of 1Tb 4bits/cell is a big milestone in NVM history and is made possible by numerous innovations in technology and design that further extend the capability of our Floating Gate 3D NAND technology," said RV Giridhar, Intel vice president, Non-Volatile Memory Technology Development. "The move to 4bits/cell enables compelling new operating points for density and cost in Datacenter and Client storage."

#### About Micron Technology, Inc.

Micron Technology is a world leader in innovative memory solutions. Through our global brands — Micron, Crucial<sup>®</sup> and Ballistix<sup>®</sup> — our broad portfolio of high-performance memory technologies, including DRAM, NAND, NOR Flash and 3D XPoint<sup>™</sup> memory, is transforming how the world uses information. Backed by nearly 40 years of technology leadership, Micron's memory solutions enable the world's most innovative computing, consumer, enterprise storage, data center, mobile, embedded, and automotive applications. Micron's common stock is traded on the Nasdaq under the MU symbol. To learn more about Micron Technology, Inc., visit [micron.com](http://micron.com).

#### About Intel Corporation

Intel (NASDAQ:INTC) expands the boundaries of technology to make the most amazing experiences possible. Information about Intel can be found at [newsroom.intel.com](http://newsroom.intel.com) and [intel.com](http://intel.com).

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